ASSIGNMENT 1

Textbook Assignment: "Surface Navigation Systems," chapter 1, pages 1-1 through 1-19; and "Tactical Air Navigation," chapter 2, pages 2-1 through 2-9.

1-1. Tactical navigation is directly concerned with maneuvering the ship in navigable waters.

1. True
2. False

1-2. Estimating ship's position between known navigational points or fixes is known as

1. ship maneuvering
2. dead reckoning
3. ship reckoning
4. dead maneuvering

1-3. Radio navigation consists of which of the following categories?

1. Sub-space systems
2. Space-based systems
3. Terrestrial systems
4. Both 2 and 3 above

1-4. One of the characteristics of dead reckoning is that the accuracy of the estimated position never exceeds the navigation method used to obtain the last fix. What happens to the accuracy of the estimated position over time?

1. It increases
2. It decreases
3. It stays the same
4. It fluctuates

1-5. Referring to landmarks with known positions on earth describes which one of the following navigation methods?

1. Celestial
2. Charting
3. Dead reckoning
4. Piloting

1-6. Which of the following actions required to determine position in piloting is/are not required in electronic navigation?

1. Seeing the landmarks
2. Determining the ship's heading
3. Having the ship on a dead reckoned course
4. Both 2 and 3 above

1-7. According to the 1992 Federal Radio Navigation Plan, which of the following systems will become the primary reference navigation system for surface ships?

1. LORAN
2. OMEGA
3. NAVSTAR
4. TACAN

1-8. LORAN takes advantage of what radio signal characteristic?

1. Constant amplitude
2. Constant velocity
3. Constant phase
4. Constant volume

1-9. OMEGA is a hyperbolic phase—difference measuring system that compares the phase angle of two or more radio signals synchronized to what device or factor?

1. A common receiver
2. A common signal shift
3. A common time base
4. A common transmitter

1-10. Which navigation system continually computes the latitude and longitude of a ship by sensing acceleration?

1. NAVSTAR
2. OMEGA
3. MILSTAR
4. SINS

1-11. A ship's inertial navigation system is dependent on celestial, sight, and radio navigation aids.

1. True
2. False

1-12. What device measures changes in speed or direction along the axis in which it lies?

1. Gyroscope
2. Accelerometer
3. Axilometer
4. Servoscope

1-13. What type of system is used to keep a SINS platform stabilized?

1. Servo
2. Synchro
3. Gyro
4. Turbo

1-14. Which of the following is a stand-alone SINS?

1. AN/WSN-5
2. AN/WSN–25
3. AN/WRN-6
4. AN/WRN-8

1-15. Approximately how often can operators using the NNSS obtain fixes?

1. Every hour
2. Every 2 hours
3. Every 3 hours
4. Every 4 hours

1-16. NNSS satellites transmit phase modulated data every 2 minutes on how many rf carriers?

1. One
2. Two
3. Three
4. Four

1-17. What are the two types of NNSS satellite parameters included in the phase-modulated data?

1. Systems and command
2. Terrestrial and space
3. Status and update
4. Fixed and variable

1-18. The nominal orbit of NNSS satellites is what type of orbital parameter?

1. Status
2. Command
3. Systems
4. Fixed

1-19. NNSS satellite data can be used as an accurate time reference.

1. True
2. False

1-20. NNSS satellite refined orbits are calculated at which of the following facilities?

1. Tracking station
2. Control station
3. Computer center
4. Injection station

1-21. Which of the following facilities calculates NNSS satellite clock error before satellite message injection?

1. Control center
2. Computer center
3. Tracking station
4. Injection station

1-22. Approximately how long does it take the injection station to transmit information to an NNSS satellite?

1. 10 seconds
2. 12 seconds
3. 15 seconds
4. 18 seconds

1-23. If errors are detected during a readback of freshly injected satellite data, how often is NNSS satellite message injection repeated until the transmission is verified as being correct?

1. Every 20 seconds
2. Every 2 minutes
3. Every 2 hours
4. Every 12 hours

IN ANSWERING QUESTIONS 1-24, 1–25, AND 1–26, REFER TO FIGURE 1–7 IN CHAPTER 1 OF THE TRAMAN.

1-24. At what point during the satellite pass will expansion effects cause the received frequencies to drop below the generated frequencies?

1. T1
2. T2
3. T3

1-25. At what point will the received frequencies exactly match the transmitted frequencies?

1. T1
2. T2
3. T3

1-26. At what point will compression effects cause the received frequencies to be higher than the transmitted frequencies?

1. T1
2. T2
3. T3

1-27. Which of the following factors affects the measurement of Doppler shift?

1. Refraction
2. Reflection
3. Reduction
4. Reproduction

1-28. To solve the problem of Doppler shift accuracy, satellites are designed to transmit on how many frequencies?

1. One
2. Two
3. Three
4. Four

1-29. Accurate NNSS position fixes for a moving vessel require what additional computation?

1. Vessel’s draft
2. Vessel’s length
3. Vessel’s speed
4. Vessel’s class

1-30. Which ship’s system will provide the information required to perform the additional computation required by NNSS?

1. OMEGA
2. LORAN
3. PNNS
4. SINS

1-31 l Given the orbital parameters of a satellite, the Doppler shift of the signal transmitted from that satellite, and the velocity of a vessel, it is possible to obtain a navigational fix if the satellite is within what distance from the navigation set?

1. Skip zone
2. Line–of–sight
3. Scatter zone
4. Line-of-support

1-32. One of the capabilities of the AN/WRN-5 includes time-ordered alerts for up to how many satellites?

1. Six
2. Two
3. Eight
4. Four

1-33. What is the “at sea” accuracy of the AN/SRN-19(V)2?

1. 0.25 feet
2. 0.25 meters
3. 0.25 miles
4. 0.25 kilometers

1-34. What activity may degrade the accuracy of the AN/SRN-19(V)2?

1. Ship’s maneuvers
2. Sunspots
3. Rain
4. High sea state

1-35. You are initializing the AN/SRN-19(V)2. In addition to programing the set's position, what other parameter must you enter?

1. Antenna height
2. Ship's length
3. Usable power
4. Cabling length

1-36. What navigational system will replace the NNSS?

1. NAVSTAR GPS
2. OMEGA MK2
3. LORAN D
4. NNSS MK2

1-37. Which of the following terms describe GPS satellite positioning data?

1. Update and status
2. Variable and fixed
3. Daily and hourly
4. Almanac and ephemeris

1-38. How often is the GPS satellite navigation data message updated?

1. Every hour
2. Every 12 hours
3. Every 24 hours
4. Every 36 hours

1-39. What facility transmits the data required to update the GPS satellite navigation data message?

1. Manned control center
2. Manned tracking station
3. Unmanned monitor station
4. Unmanned injection station

1-40. There are how many (a) active spare and (b) active operational GPS satellites?

1. (a) 21 (b) 3
2. (a) 3 (b) 21
3. (a) 3 (b) 24
4. (a) 24 (b) 21

1-41. How many earth orbits will each GPS satellite complete in a 24-hour period?

1. One
2. Two
3. Three
4. Four

1-42. What communications technique is used for GPS satellite broadcasts?

1. Spontaneous-emission
2. Spread-spectrum
3. Standard-broadcast
4. Spectral-emission

1-43. GPS satellites are positioned so a minimum of how many satellites are observable to a user anywhere on earth?

1. One
2. Two
3. Three
4. Four

1-44. Which of the two codes (C/A and P) transmitted by GPS satellites is NOT available to civilian users?

1. Course acquisition code
2. Precise code

1-45. Which of the following data is NOT included in the GPS NAV-msg?

1. Clock-bias
2. Correction data
3. Ephemeris
4. Spectral

1-46. GPS navigation is based on what principle?

1. Satellite ranging
2. Satellite speed
3. Satellite broadcast
4. Satellite response

1-47. Within how many feet can GPS determine position fixes?

1. 50
2. 250
3. 500
4. 1000

1-48. To obtain the above accuracy, how many satellite inputs are required?

1. Five
2. Two
3. Three
4. Four

1-49. How is the time difference between satellite transmission and when the navigation set receives this signal related to the distance between the satellite and the receiver?

1. Inversely proportional
2. Directly proportional

1-50. GPS satellites use atomic clocks; the receivers do not. What type of error must be computed based on this fact?

1. Delay
2. Eccentricity
3. Modulation
4. Clock

1-51. Tropospheric delay is predicted and included in what satellite data?

1. Bias
2. Almanac
3. Variable
4. Precision

1-52. Ionospheric delay is greatest when a signal is received from directly overhead.

1. True
2. False

1-53. Of the frequencies listed below, which one will ionospheric delay phase-shift the most?

1. 1227.60 MHz
2. 1575.42 MHz
3. 1883.65 MHz
4. 2879.23 MHz

1-54. Satellite signals reflecting off one or more objects before reaching the navigation set produce what type of reception?

1. Multipath
2. Faded
3. Skip-zone
4. Ground-wave

1-55. What data do operators enter into the AN/WRN-6(V) to speed up satellite acquisition?

1. Satellite type
2. Time and date
3. Current position
4. Both 2 and 3 above

1-56. Which of the following is the normal operating mode of the AN/WRN-6(V)?

1. Initialization
2. Test
3. Navigation
4. Tracking

1-57. Which of the following is a portable GPS receiver?

1. AN/WRN-6
2. AN/WSN-5
3. AN/PSN-8
4. AN/SPA-2

1-58. TACAN is based on what type of radio air-navigation system?

1. Polar-coordinate
2. Polar-sync
3. Neutral-coordinate
4. Neutral-sync

1-59. Instead of depending on radio-wave reflection, beacon-transponders generate what type of replies?

1. Neutral
2. Artificial
3. Basic
4. Torque

1-60. What type of decoders do TACAN transponders use?

1. Twin-pulse
2. Single-pulse
3. Neutral-pulse
4. Basic-pulse

1-61. Which of the following receiver controls provides noise-generated output?

1. Fidelity
2. Sensitivity
3. Cycle
4. Squitter

1-62. If more interrogating aircraft come into the TACAN'S range, the number of noise-generated pulses will

1. increase
2. decrease

1-63. What signal does the TACAN ground station transmit to identify itself?

1. Identification pulse group
2. Voice pulse group
3. Triangulation pulse group
4. Burst pulse group

1-64. What characteristic of the transmitted TACAN pulses supplies the distance information to aircraft?

1. Amplitude
2. Frequency
3. Timing
4. Gain

1-65. What type of modulation is used to convey TACAN bearing information?

1. Frequency
2. Pulse
3. Continuous wave
4. Amplitude modulation

1-66. What type of radiation pattern is transmitted by the TACAN ground station antenna?

1. Parabolic
2. Cardioid
3. Vectorial
4. Tangential

1-67. What is the common name of the 135-Hz reference burst?

1. Composite burst
2. North reference burst
3. Auxillary reference burst
4. East reference burst

1-68. How often is the identification code broadcast?

1. Every 37.5 seconds
2. Every 60 seconds
3. Every 37.5 minutes
4. Every 60 minutes

1-69. What is the designation of latest TACAN equipment in the fleet?

1. AN/URN-25
2. AN/URN-20
3. AN/URN-15
4. AN/URN-10

1-70. In the AS-3240 electronically-scanned antenna, the old single-phase rotating parasitic element has been replaced by how many electronically-switched inner parasitic elements?

1. 6
2. 12
3. 24
4. 32

1-71. What is one big advantage the electronically-scanned antenna has over the old mechanically-rotated antenna?

1. It eliminates bandwidth limitations
2. It is cheaper to build
3. It is easier to troubleshoot
4. It eliminates propagation effects

1-72. The AN/URN-20 uses the same electronically-scanned antenna as the AN/URN-25.

1. True
2. False

1-73. What is the total number of TACAN channels available using both X and Y modes?

1. 68
2. 100
3. 126
4. 252

1-74. The TACAN receiver frequency is always displaced how many MHz from the transmitter frequency?

1. 20
2. 42
3. 63
4. 75

1-75. How many aircraft can be provided distance data simultaneously?

1. 25
2. 50
3. 75
4. 100